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conclusions, yet his paper demonstrates one of the many possibilities in this branch of cecidology.

Among the more important taxonomic papers is LEEUWEN-REIJNVAAN'S[5] fifth contribution on the galls of Java. They describe 49 different galls, 21 of which are figured. These galls are grouped with reference to the plants on which they occur, and are assigned to genera but not given specific names.

MASSALONGO[6] describes 8 new species of galls, 7 of which are due to insects and 1 to fungi.—MEL T. COOK.

Sand dune and subalpine vegetation in New Zealand.—With a sand dune area of some 300,000 acres, the question of its reclamation becomes one of national importance in New Zealand, especially since through their advance the dunes ruin much valuable land. In a previous paper by COCKAYNE, reviewed in this journal,[7] the ecological problems of these areas were discussed, and the influence of pasturing, tree cutting, and burning was noted as increasing the movement of the dunes to a marked degree. In a more recent publication,[8] the same investigator has restated many of his former conclusions, and in addition has discussed the best methods for reclaiming actively moving dunes, for protecting farm lands and other valuable areas from the encroaching sand, and for preventing the rejuvenescence of fixed dunes. The efficiency of marram grass (*Ammophila arenaria*) as a sand holder is emphasized, while the tree lupin (*Lupinus arboreus*) is found to be an excellent shrub to reinforce the grass and to act as a pioneer in the process of reforestation, which is recognized as offering the greatest permanent stability combined with the transformation of a barren and dangerous into a productive region. Some action by the New Zealand Government seems likely to result from these recommendations.

COCKAYNE and his associates have also been making a preliminary ecological survey of a mountainous area in the Southern Alps region of New Zealand.[9] The highest peak here is Mt. Arrowsmith, 9171 ft., and it is surrounded by others of somewhat less altitude. Glaciers occur rather plentifully, and the region gives evidence of much more extensive ice sheets in the past. Two climatic regions are here closely adjacent, due to differences in rainfall depending upon exposure to the moist westerly winds. In the more mesophytic region, with an annual rainfall of about 250 cm., a rain forest formation develops, its conspicuous trees being *Podocarpus Hallii*, *Librocedrus Bidwillii*, and two species of *Phyllocladus*.

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[5] LEEUWEN-REIJNVAAN, J. und W. DOCTERS VAN, Einige Gallen aus Java. V. Marcellia **10**:65–91. 1911.

[6] MASSALONGO, C., Zoocecidii e fitocecidii rare o nuovi. Marcellia **10**:94–97. 1911.

[7] BOT. GAZ. **50**:478. 1910.

[8] COCKAYNE, L., Report on the dune areas of New Zealand, their geology, botany, and reclamation. Department of Lands. 4to. pp. 76. *pls. 72*. 1911. Wellington: John Mackay, Government Printer.

[9] SPEIGHT, R., COCKAYNE, L., and LAING, R. M., The Mount Arrowsmith district; a study in physiography and plant ecology. Trans. N.Z. Institute **43**:315–378. 1911.

In the more xerophytic portion of the region, while the precipitation is quite considerable, exposure to strong insolation and almost continuous winds produces a steppe formation. This is developed upon several sorts of rocky substrata, and is characterized by an abundance of shrubby, tussock, and cushion plant forms. The succession in some stony river beds has been more carefully studied,[10] and may indicate the interesting results likely to follow more detailed investigation of other similar situations. From a pioneer *Epilobium* association there develops one characterized by the genus *Raoulia*, plants remarkable for the development of strikingly unique cushion forms. Various species of these curious composites are abundant throughout the steppe formation, reaching their most striking development in the "vegetable sheep" association of certain rocky hillsides. The climax association of the river beds is a subalpine scrub of the usual type.—GEO. D. FULLER.

Iron bacteria.—A recent contribution by LIESKE[11] is of importance in that it supplements our knoweldge of the iron bacteria that has come to us largely through the writings of MOLISCH. It also revives interest in WINOGRADSKY'S theory of iron assimilation, and illustrates in its comparative results the ever-present danger of generalizing from a too narrow inquiry into the field of research.

The author has made an intensive study of one of the numerous species of iron bacteria known as *Spirophyllum ferrugineum* Ellis, enlightening us regarding its specific cultural and physiological peculiarities. Unlike *Leptothrix octhracea* studied by MOLISCH, this bacterium does not grow in a medium containing organic matter; neither in an iron-free medium, nor in a medium containing iron salts other than ferrous carbonate or bicarbonate, nor salts of any of the other metals.

Of chief physiological importance is the experimental proof that the organism can utilize the carbon of CO_2 introduced into a flask from which every other source of carbon can be excluded; the nutrient medium contains in solution inorganic salts, iron filings are added, and CO_2 is furnished to the extent of 1 per cent of the air in the flask. Naturally, then, issue is taken with MOLISCH, who in his recent monograph (*Die Eisenbakterien*[12]) denies the correctness of WINOGRADSKY'S hypothesis that iron bacteria require iron

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[10] COCKAYNE, L., On the peopling by plants of the subalpine river bed of the Rakaia. Trans. and Proc. Bot. Soc. Edinburgh **24**^{3}:104–125. 1911.

[11] LIESKE, R., Beiträge zur Kenntnis der Physiologie von *Spirophyllum ferrugineum* Ellis, einem typischen Eisenbakterium. Jahrb. Wiss. Bot. **49**:91–127. 1911.

[12] Reviewed in this journal, **50**:464.